

FAIL SAFE RECOVERY

INVENTORS

JEFFREY SCOTT HASTINGS**RUXIANG WANG****CROSS-REFERENCE TO RELATED APPLICATION**

[0001] This application claims the benefit of U.S. Provisional Application No. 60/240,615, filed October 15, 2000, and hereby incorporated by reference herein.

BACKGROUNDFIELD OF THE INVENTION

[0002] This invention pertains in general to a consumer electronic device having a media storage such as a hard drive and in particular to recovering from a failure in such a device.

BACKGROUND ART

[0003] Modern consumer electronic devices, such as digital video recorders (DVRs), are more complicated than prior devices. A DVR, for example, typically stores software for controlling the device, as well as the recorded content, on a hard drive or other media. Firmware in the DVR loads the software from the hard drive into random access memory (RAM), and a processor in the DVR executes the instructions contained therein.

[0004] Due in part to this extra complexity, modern consumer electronic devices occasionally suffer operational errors. Generally, the errors fall into one of two

categories: soft and hard. A “soft” error is an error that can be resolved without replacing a component of the device. Another definition of a soft error is an error that significantly affects the performance of the device yet does not render the device useless. For example, a logic error in program code stored in a modifiable memory is a soft error. Similarly, a corrupt sector on a hard drive or a corrupt value in a random access memory are other examples of soft errors. A “hard” error is an error that renders the device useless and requires replacement (or repair) of a component of the device. For example, a catastrophic failure of a hard drive or other critical physical component is a hard error.

[0005] Regardless of the type of error, most consumer electronic devices cannot be repaired by a typical consumer. The consumer electronic devices typically lack sophisticated memory storage, processing, and communications capabilities due to the devices’ relatively low costs. Most consumers also do not wish to troubleshoot or “debug” consumer electronic devices. In addition, the devices are too numerous and not valuable enough to justify sending a repair technician to their locations.

[0006] Accordingly, it is often necessary for consumers to send the devices to a repair center even when the devices suffer only soft errors. This step is time and labor intensive, as well as costly. Thus, there is a need in the art for a way to repair consumer electronic devices, such as DVRs, suffering from soft errors without requiring the users to perform complicated repair procedures or send the devices in for repair.

DISCLOSURE OF THE INVENTION

[0007] The above need is met by a consumer electronic device that automatically communicates with one or more remote servers in an attempt to diagnose and repair itself. The consumer electronic device, such as a digital video recorder (DVR), has a hard drive or other media storage storing program code modules and content and a network interface for interfacing with a diagnostic server and a software server. Content is stored in a content area of the media storage, modules for monitoring and controlling the consumer electronic device are stored in a system area, and recovery modules are stored in an error recovery area. The monitoring modules detect when to activate the recovery modules. The recovery modules attempt to diagnose the error suffered by the consumer electronic device and attempt one or more solutions in response. One solution performed by the recovery modules is to activate a network recovery module that causes the device to download and execute program modules from a remote server in an attempt to repair the condition that caused the soft error.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] FIG. 1 is a high-level block diagram illustrating an environment containing a digital video recorder (DVR);

[0009] FIG. 2 is a block diagram illustrating a high-level view of the components of the DVR;

[0010] FIG. 3 is an illustration of the media storage of FIG. 2 according to an embodiment of the DVR;